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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,037	08/15/2001	Toru Koizumi	03500.015698.	1876

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EXAMINER	
QUIETT, CARRAMAH J	
ART UNIT	PAPER NUMBER
2622	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/929,037	KOIZUMI ET AL.	
	Examiner	Art Unit	
	Carramah J. Quiett	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5-24,26 and 27* is/are pending in the application.

4a) Of the above claim(s) *9-16 and 21-24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5,7,8,17-20,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment(s), filed on 04/08/2009, have been entered and made of record. Claims 5-24 and 26-27 are pending, of which claims 9-16 and 21-24 are withdrawn from consideration. The Applicant has canceled claims 1-4, 6, 25 and 28.

Response to Arguments

2. Applicant's arguments with respect to claims 5, 7-8, 17-20, 26, and 27 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. **Claims 5, 7-8 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamasaki et al. (U.S. Patent #5,187,583) in view of Suzuki et al. (U.S. Patent #5,828,407) and Takahashi (U.S. Patent #5,955,753).

For **claim 5**, Hamasaki discloses an image pickup device (fig. 1) comprising:

a plurality of pixels (ref. 5 – FDA) each including a floating diffusion region (fig. 1, not numbered; (col. 3, lines 8-19), a floating diffusion region (FD) to which a signal from said photoelectric conversion unit is transferred (col. 3, lines 21-35), a transfer switch (2 – OG) to transfer the signal from said photoelectric conversion unit to said floating diffusion region (col. 3, lines 21-35), and an amplifying transistor (ref. 4) whose gate is connected to said floating

diffusion region to read out the signal from said floating diffusion region (col. 3, lines 21-35); and

a drive circuit (ref. 8) coupled to said plurality of pixels (col. 3, lines 20-39).

However, Hamasaki does not expressly disclose a drive circuit to output a pulse wave form signal for controlling said transfer switch so that a time during which said transfer switch changes from an ON state to an OFF state becomes longer than a time during which said transfer switch changes from the OFF state to the ON state; wherein, during the ON state, charge is transferred from said photoelectric conversion unit to said floating diffusion region.

In a similar field of endeavor, Suzuki discloses a transfer switch (fig. 11A, transfer pulse lines V_1~V_4, 21, 25; col. 1, lines 28-44; col. 6, lines 47-52; col. 7, lines 7-14), and a drive circuit (fig. 1, refs. 2-4, 10-11; col. 6, lines 58-65) to output a pulse wave form signal (transfer pulses V_1, V_3; see fig. 4) for controlling said transfer switch so that a time during which said transfer switch changes from an ON state (V_M/V_H) to an OFF state (V_L) becomes longer than (readout, t2-t7) a time during which said transfer switch changes from the OFF state to the ON state (t1-t2; col. 9, lines 15-63). Also in Suzuki, please see figs. 3-5. In light of the teaching of Suzuki, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the driving circuit of Hamasaki with the driving circuit as recited in claim 5 in order to improve the dynamic range of the image thereby realizing high charge transfer efficiency without causing blooming (Suzuki, col. 4, lines 49-56).

Also, in a similar field of endeavor, Takahashi teaches wherein, during the ON state, charge is transferred from said photoelectric conversion unit to said floating diffusion region. Please see figs. 1-4 and read col. 5, line 55 – col. 6, line 5. In light of the teaching of Suzuki, it

would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the driving circuit of Hamasaki with the driving circuit as recited in claim 5 in order to improve high sensitivity image pickup for an image in a dark state (Takahashi col. 6, lines 8-13).

For **claim 7**, Hamasaki, as modified by Suzuki and Takahashi, teaches the device according to claim 5, wherein said photoelectric conversion unit includes an embedded photodiode (Hamasaki, fig. 1; col. 3, line 8-19).

For **claim 8**, Hamasaki, as modified by Suzuki and Takahashi, discloses the device (Suzuki, fig. 1) according to claim 5 further comprising an analog/digital conversion circuit (ref. 6) *adapted to** convert a signal from each of said plurality of pixels into a digital signal (col. 7, lines 1-3), a signal processing circuit (ref. 7) *adapted to** process the signal from said analog/digital conversion circuit (col. 7, lines 1-5), and a recording circuit (ref. 9) *adapted to** record the signal processed by said signal processing circuit (col. 7, lines 1-7).

Regarding **claim 26**, this claim is a method claim corresponding to the apparatus claim 5. Therefore, claim 26 is analyzed and rejected as previously discussed with respect to claim 5.

5. **Claims 17-20 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gowda et al. (U.S. Patent #6,344,877) in view of Kline et al. (U.S. Patent #5,134,428).

For **claim 17**, Gowda discloses an image pickup device (fig. 2) comprising:

a plurality of pixels (fig. 2, ref. 30; col. 4, lines 1-7) each including a photoelectric conversion unit (fig. 3, ref. 26), a semiconductor area to which a signal from said photoelectric conversion unit is transferred (col. 4, line 62 – col. 5, line 18), a transfer switch (fig. 3, ref. 22) to transfer the signal from said photoelectric conversion unit to said semiconductor area (col. 5,

lines 19-59), and a read unit (fig. 3, ref. 23) to read out the signal from said semiconductor area (col. 5, line 50-59); and a drive circuit coupled to said plurality of pixels (fig. 2, ref. 14; col. 4, lines 27-62) to output a signal to control said transfer switch so that a fall speed V_{off} for changing said transfer switch from an ON state to an OFF state has a relation 1.2, 1.8, 2.5, 3.3, or 5 volts on the order of 2μsec (col. 7, lines 16-23 and col. 8, lines 29-40).

However, Gowda does not expressly teach that changing said transfer switch from an ON state to an OFF state has a relation 10 V/μsec>V_{off}.

In a similar field of endeavor, Kline discloses a drive circuit to output a signal to control a transfer switch so that a fall speed V_{off} for changing the transfer switch from an ON state to an OFF state has a relation 10 V/μsec>V_{off}. Please read col. 6, lines 29-37. In light of the teaching of Kline, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the driving circuit of Gowda with the drive circuit as recited in claim 17 in order to facilitate high-speed imaging (Kline, Abstract).

For **claim 18**, Gowda, as modified by Kline, discloses the device according to claim 17, wherein said read unit includes an amplification transistor (fig. 3, ref. 23) for amplifying and outputting the signal in said semiconductor area (col. 5, lines 50-59).

For **claim 19**, Gowda, as modified by Kline, discloses the device according to claim 17, wherein said photoelectric conversion unit includes an embedded photodiode (fig. 3, ref. 26; col. 4, line 62 – col. 5, line 18).

For **claim 20**, Gowda, as modified by Kline, discloses the device according to claim 17, further comprising

an analog/digital conversion circuit (fig. 2, ref. 52) *adapted to** convert a signal from each of said plurality of pixels into a digital signal (col. 4, lines 12-15).

a signal processing circuit (fig. 2, ref. 44) *adapted to** process the signal from said analog/digital conversion circuit (col. 4, lines 59-61), and

a recording circuit (fig. 2, after ref. 44) *adapted to** record the signal processed by said signal processing circuit – inherently, because after ref. 44 (col. 4, lines 59-61), the image signals are transferred to processing/image storage electronics. Please see fig. 2.

Regarding **claim 27**, this claim is a method claim corresponding to the apparatus claim 17. Therefore, claim 27 is analyzed and rejected as previously discussed with respect to claim 17.

***Note:** The Applicant's "*capable of*" language and "*adapted to*" language as used in the claims broadens the scope of the claims. The MPEP states that, "Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by language that does not limit a claim to a particular structure." (MPEP 2111.04 [R-3]) In other words at the U.S. Patent and Trademark Office, if a limitation is written with "*capable of*" language and/or "*adapted to*" language, a reference is deemed to meet that limitation if the reference discusses the same element that, although not actually performing the claimed function, is **structurally capable of** performing it. Accordingly, the Examiner *will not* give a limitation with "*capable of*" language and/or "*adapted to*" language patentable weight.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carramah J. Quiett whose telephone number is (571)272-7316. The examiner can normally be reached on 8:00-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David L. Ometz/
Supervisory Patent Examiner, Art Unit 2622

/C. J. Q./
Examiner, Art Unit 2622
July 3, 2009